REMARKS

Upon review of the Amendment filed May 22, 2007, an error was discovered in claim 3 (Currently amended), in that recitation of "an element that reacts with fluorine" had been deleted from the components of the plasma generated for cleaning an aluminum fluoride deposit in the vacuum container. Note claim 15. In view thereof, Applicants are presently amending claim 3 to recite that the period for cleaning is provided "by generating plasma containing chlorine gas and hydrobromic gas and an element that reacts with fluorine". Noting original claim 3, clearly the present amendment of claim 3 does not raise any issue of new matter, and has been submitted in order to more accurately define the method to be claimed therein, so that the plasma includes an element that reacts with fluorine for cleaning the aluminum fluoride deposit.

Initially, entry of the present amendments is respectfully requested, notwithstanding 37 CFR 1.111(a)(2). By restoring a claim recitation as previously considered by the Examiner, it is respectfully submitted that the present supplemental amendments clearly simplify issues, and thus entry is clearly appropriate; see 37 CFR 1.111(a)(2)(i)(F). It is respectfully submitted that entry of the present supplemental amendments is proper to advance prosecution, particularly in light of claims considered by the Examiner in the Office Action mailed February 22, 2007.

It is respectfully submitted that Applicants have provided a proper basis for entry of the enclosed supplemental amendments, under 37 CFR 1.111(a)(2), and, accordingly, entry of the present amendments is respectfully requested.

In addition to contentions made in connection with patentability of the subject matter of claim 3 over the prior art applied in the Office Action mailed February 22,

2007, Applicants respectfully submit that following arguments, with respect to claim 3 as presently amended.

That is, it is respectfully submitted that the applied references would have neither taught nor would have suggested such a method for cleaning processing a plasma processing chamber, including providing a period for cleaning an aluminum fluoride deposit in the vacuum container by generating plasma containing chlorine and hydrobromic gasses and an element that reacts with fluorine to create a gas-phase reaction product. See claim 3.

Illustratively, and not to be limiting, according to the present invention, a plasma is generated with chlorine gas, hydrobromic gas and $SiCl_4$ containing Si atoms which react with fluorine to create a gas-phase reaction product, whereby the vacuum container is cleaned of an aluminum fluoride deposit therein, by the generated plasma.

Japanese Patent Document No. 09-171999 (JP '999) discloses a plasma cleaning treatment, performed subsequent to etching, with a mixed gas plasma of BCl_3 and Cl_2, a laminated structure film which uses an organic film and which contains, inter alia, a barrier metal. This patent document discloses that in order to remove the reaction product of the etching treatment, the inside of the etching treatment chamber is plasma-treated with H_2O gas, and then the inside of the etching treatment chamber is plasma-treated with a gas containing chlorine. After that, the inside of the etching treatment chamber is plasma-treated additionally with O_2 gas.

It is respectfully submitted that this reference does not disclose, nor would have suggested, such method as in the present claims, including wherein the plasma

contains hydrobromic gas and chlorine gas and an element that reacts with fluorine, to create the gas-phase reaction product, and advantages achieved due thereto.

As will be shown in the following, taking the teachings of the references as applied by the Examiner, these references do not disclose, nor would have suggested, the plasma with the combination of chlorine gas and hydrobromic gas and the element that reacts with fluorine.

Thus, Japanese Patent Document No. 2000-012515 (JP '515) discloses a plasma cleaning method for microwave plasma etching apparatuses, wherein an etching chamber is cleaned with a mixed gas of BCl_3 with Cl_2 after ending the etching.

Japanese Patent Document No. 11-186226 (JP '226) discloses a method for removing a remaining deposit on the inner wall of a plasma processor, including a cleaning step with an O gas plasma and cleaning step with a mixed gas plasma of Cl and BCl_3.

Japanese Patent Document No. 07-130706 (JP '706) discloses a method for cleaning semiconductor manufacturing apparatuses, wherein cleaning is carried out in the present of a Cl_2 gas, plasma treatment for cleaning being conducted with the Cl_2 gas, a reaction product made of AlF_3 being changed into an $AlCl_3$ gas that has a high vapor pressure, which gas is vaporized easily and discharged easily.

Japanese Patent Document No. 2001-308068 (JP '068) discloses a method of cleaning a chamber of an etching apparatus, which chamber has AlF_3 deposited on an inner wall thereof. The cleaning includes a first step of performing H_2O plasma processing and following the first step with a second step of performing Cl_2 plasma processing.

Even assuming, arguendo, that the teachings of either of JP '706 or JP '068 were properly combinable with the teachings of either of JP '515 or JP '226, such combined teachings would have neither disclosed nor would have suggested the presently claimed invention including use of the plasma containing chlorine gas and hydrobromic gas and an element that reacts with fluorine, including the various techniques as in the present claims for including Si, and/or other features of the present invention as set forth in the foregoing, and advantages thereof.

It is respectfully submitted that the additional teachings of Japanese Patent Document No. 09-186143 (JP '143) would not have rectified the deficiencies of JP '515 or JP '226, in combination with JP '706 or JP '068, such that the present invention as a whole would have been obvious to one of ordinary skill in the art.

JP '143 discloses a method and apparatus for cleaning by-products off plasma chamber surfaces, including a single cleaning step which involves (a) an operation of introducing a plasma reactive gas mixture containing halogen, composed of a gas containing fluorine of an equal or larger amount and containing chlorine of an equal or smaller amount, into a vacuum plasma process chamber virtually free from species containing atomic oxygen; (b) an operation of producing the plasma of the above-mentioned reactive gas; and (c) an operation of bringing the above-mentioned plasma and/or the produced species into contact with accumulated residue sticking to the inside surface of a chamber.

Even assuming, arguendo, that the teachings of JP '143 were properly combinable with the teachings of other references as applied by the Examiner, such combined teachings would have neither disclosed nor would have suggested the presently claimed invention, including, inter alia, the cleaning processing utilizing the plasma containing the chlorine and hydrobromic gasses the element that reacts with

fluorine (e.g., use of Si or an Si containing gas), and advantages thereof as in the present invention; and/or the other features of the present invention as discussed previously, and advantages thereof.

In view of the foregoing comments and amendments, and the comments and amendments in the Amendment filed May 22, 2007, entry of the present amendments and of the amendments in the Amendment filed May 22, 2007, and reconsideration and allowance of all claims presently in the application, are respectfully requested.

To the extent necessary, Applicants hereby petition for an extension of time under 37 CFR 1.136. Kindly charge any shortage of fees due in connection with the filing of this paper, including any extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Account No. 01-2135 (case 648.43608X00), and please credit any overpayments to such Deposit Account.

Respectfully submitted,

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